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3,303,147 DRY POWDER FOR WALLBOARD JOINT TREATMENT

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tion of Delaware
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This invention relates to a dry powder composition suitable, by admixture of water thereto, for adhering and concealing a joint tape over the joints of gypsum wallboard, in the well known dry wall type of construction.

The use of dry powder compositions, admixed with water, for adhering and concealing joint tape over the joints of wallboard, thereby concealing the joints and producing a generally monolithic appearance, is a well-accepted, common practice. These compositions have most commonly consisted basically of a casein or soya protein binder system. A well-known problem existent in prior joint treatment compositions is the need for the application of three or four separate applications of the compositions with a delay of at least a day after each application before subsequent work could proceed whereby the complete operation of joint treatment could involve from four days to a week or more. This problem basically results from two factors, the need for permitting the joint composition to dry and set for at least about 24 hours before further work can be done without damage to the previous completed work, and, second, the fact that the shrinkage during drying and setting of prior art compositions was in the order of 20%, whereby three or four successive relatively thin coats, or applications, were required to obtain the desired ultimate smooth and flat finished surface.

It is a primary object of the present invention to provide an improved joint treatment composition which will provide a quality of a completed joint equal or superior to prior joints with substantially less labor and with substantially less time required between consecutive steps.

It is a further object of the invention to provide a joint treatment composition having a shrinkage of only about 5% during drying and hardening.

It is a still further object of the invention to provide an improved joint treatment composition which dries and hardens sufficient for subsequent treatment thereover in about two hours, even when applied in thicknesses requiring only two coat applications.

The preferred embodiment of the present invention is set forth in the following Example I:

EXAMPLE I

	Parts by weight
CaSO ₄ ·½H ₂ O (100% minus 100 mesh) -----	1000
Emulsifiable polyvinyl acetate powder -----	80
Cold water soluble polyvinyl alcohol -----	15
Bone glue -----	3
Potassium sulfate -----	5
Polyoxyethylenearyl ether -----	10
Hydroxyethyl cellulose -----	7
Phenyl mercuric acetate -----	1
Alkylaryl sulfonate -----	1
Limestone (100% minus 100 mesh) -----	500
Bentonite clay (100% minus 100 mesh) -----	15
Mica (grade P-80) -----	150
Asbestos (grade 7TF) -----	100

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Binders

The essential binders of the invention are the ultrafine moulding plaster, referred to above as CaSO₄·½H₂O, the

emulsifiable polyvinyl acetate and the cold water soluble polyvinyl alcohol.

The ultrafine moulding plaster provides a settable binder, which hydrates to form CaSO₄·2H₂O, with a shrinkage of only about 5%. The lesser shrinkage of the composition of the invention in comparison to prior casein based joint treatment compositions will be seen to be provided in part by the fact that a substantial portion of the water reacts and combines in the novel composition whereas in the casein type compounds, all of the water added had to be dried off after application of the composition to the wallboard joints. This fact is also a basic contributing factor to the improved lessening of the time delay after application on a wall to the time when further work can proceed on the wall. For example, application of the second coat of the composition can be done about two hours after the first coat is applied.

The polyvinyl acetate emulsifiable powder is available as VINAC RP 251, or as GELVA 702.

A polyvinyl alcohol which is 85% hydrolyzed has the desirable cold water solubility.

Bone glue, or other equivalent animal glues, added primarily to function as a retarder for the setting of the plaster, also contribute binder properties, however, other known retarders for plaster, which would have no binder properties, may be substituted for the bone glue in accordance with the invention.

Potassium sulfate is added to accelerate the setting time of the plaster, and other known set accelerators may be substituted for the potassium sulfate. The combination of the above specified amounts of retarder and accelerator provide a uniform setting time of the plaster of about 2 to 2½ hours. A lesser amount of each could result in a similar average setting time, however, the uniformity of the setting time would be substantially lessened and subject to the influence of inadvertent admixtures, temperature, dirty tools, etc.

The polyoxyethylenearyl ether, available as PYCAL 94, is a plasticizer for the polyvinyl acetate, improving its adhesive characteristics other suitable plasticizers being dibutyl phthalate and tricresyl phosphate. The PYCAL 94 also acts as a dispersing agent and helps both the mixing and wet edge qualities of the product.

Thickener

As a thickening agent, hydroxyethyl cellulose is desirable and is available as Natrosol 250 HR. Also suitable as thickening agents are methyl cellulose or natural gums such as gum arabic. The thickening agents are desirable to provide body and cohesiveness to the paste-like "mud," as it is termed in the art, formed when water is added to the dry powder composition of the invention, and also to provide improved workability of the mud, particularly what is known as the wet edge working properties.

The phenyl mercuric acetate is a preservative for the hydroxyethyl cellulose. Also suitable are chlorinated phenols such as sodium pentachlorophenolate.

Wetting agent

Alkylarylsulfonate, such as Darvan #1, is added as a wetting agent, or dispersing agent, for improving the mixing of the composition with water, and the ability of the resultant mud to wet the wallboard paper without producing rapid water absorption into the paper. Any suitable wetting agent may be substituted, such as tri-polyphosphate or potassium polyphosphate.

Fillers

The limestone, bentonite clay, mica and asbestos are primarily fillers, each, however, contributing varying working qualities to the mud formed when water is added to the powder composition of the invention. All function in part as pigments. The bentonite clay tends